

## **ABSTRACT**

An apparatus is provided for separation of suspended solid particles from fluids, for separation and mixing of fluids, and for dissolving gases in aqueous fluids. The apparatus employs a grooved ring to divide the fluid stream and impart a high velocity on each of the divided or sub-streams. A grooved ring with any number of grooves that may be spiral in shape is used to create a high velocity circular motion on a divided stream for separation of suspended solid particles by centrifugal force in a cyclone filter and for saturation of liquid with gases in a fluid mixer where gases are introduced through a diffuser. A grooved ring with any number of grooves that may be radial is used in a fluid mixer to divide a stream of fluid, produce a high velocity flow through each groove, introduce a second fluid through an orifice into the first fluid flowing through each groove, and direct the fluid mixture to a center impact zone where the various streams collide to complete the mixing.